

SECTION 05500

METAL FABRICATIONS

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

- A. Materials and operations standards:
 - 1. AAMA, Architectural Aluminum Manufacturer's Association.
 - 2. AISC, American Institute of Steel Construction.
 - 3. ASTM, American Society for Testing and Materials.
 - 4. AWS, American Welding Society.
 - 5. F.S., Federal Specifications.
 - 6. NAAMM, National Association of Architectural Metals Manufacturers.

1.2 SUBMITTALS

- A. Project information:
 - 1. Engineering design calculations for components of stairs and landings with design live loads noted, sealed by Professional Engineer licensed in State of Georgia, to be reviewed for general compliance with intent of information given in Contract Documents.

1.3 JOB CONDITIONS

- A. Provide sleeves, embedded anchors and other built in items in time for installation, or pay costs of cutting in items later, and grouting.
- B. Verify field conditions prior to fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Acceptable manufacturers:
 - 1. Primer:
 - a. Base:
 - 1) Tnemec.
 - b. Optional:
 - 1) Glidden.
 - 2) Con-Lux Coatings.
 - 2. Galvanizing repair paint:
 - a. Base:
 - 1) ZRC Products.
 - 2) Tnemec.
 - b. Optional:
 - 1) Galvanized steel manufacturer.
 - 3. Dissimilar metal protection coating:
 - a. Base:
 - 1) Tnemec.
 - b. Optional:
 - 1) Glidden.
 - 2) Con-Lux Coatings.
 - 4. Coal tar epoxy:
 - a. Base:
 - 1) Tnemec.

- b. Optional:
 - 1) Glidden.
 - 2) Porter.
 - 5. Grout, non-shrink:
 - a. Base:
 - 1) Minwax Construction Products.
 - 2) Sauereisen.
 - b. Optional:
 - 1) Specific metal product fabricator.
 - 6. Other manufacturers desiring approval comply with Document 00440.
- B. Structural steel: ASTM-A36/A36M, ASTM-A501, ASTM-A575 or ASTM-A108.
- C. Cast steel: ASTM-A27/A27M, Grade-65-35; and ASTM-A148/A148M, Grade-80-50.
- D. Steel forgings: ASTM-A668.
- E. Rivet steel: ASTM-A502.
- F. Bolts: ASTM-A307, ASTM-A325, ASTM-A354.
- G. Filler metal: AWS Standards.
- H. Cast iron: ASTM-A48, Class 30, minimum 30,000 PSI tensile.
- I. Malleable iron: ASTM-A47 and ASTM-A197.
- J. Steel pipe: ASTM-A53.
- K. Galvanizing: ASTM-A123 or ASTM-A653/A653M.
- L. Aluminum: ASTM-B308/B308M for particular alloy in standard shapes and extrusions, ASTM-B26/B26M for castings.
- M. Stainless steel: ASTM-A484/A484M and ASTM-A276, Type 302 or 304 where concealed, Type 304 were exposed.
- 1. ASTM-A480 AISI finish number 4 where exposed, unless otherwise indicated.
- N. Anchorage devices, masonry:
- 1. Standard manufactured items.
 - 2. Lead expansion shields for machine screws and bolts 1/4 IN and smaller: Head out embedded nut type.
 - 3. For machine screws and bolts larger than 1/4 IN: Manufacturers' standard.
 - 4. Bolt anchor expansion shields for lag bolts: Zinc alloy, long shield anchors.
 - 5. Bolt anchor expansion shields for bolts: Closed end bottom bearing type.
- O. Fasteners:
- 1. Galvanized steel or stainless where built into exterior walls.
 - 2. Select fasteners for type, grade and class required.
 - 3. Bolts and Nuts: Regular hexagon head ASTM-A307, Grade-A.
 - 4. Lag Bolts: Square or octagonal head type.
 - 5. Machine Screws: Cadmium plated steel.
 - 6. Wood Screws: Flat head carbon steel.
 - 7. Plain Washers: Round, carbon steel.
 - 8. Lock Washers: Helical spring carbon steel.
- P. Primer:
- 1. Tnemec P37H-77 Chem-Prime or equivalent product by Glidden or Con-Lux.
 - 2. Use primer compatible with finish coats of paint.
 - 3. Coordinate metal primer with finish paint requirements specified in Section 09900.
- Q. Galvanizing repair paint:
- 1. High zinc dust content paint for regalvanizing welds and abrasions in galvanized steel.

2. Z R C by ZRC Products, or Tnemec 90-97 organic zinc coating, or equivalent product by galvanized steel manufacturer.
- R. Dissimilar metal protection coating:
 1. Tnemec Tneme-Tar 413 or coal tar epoxy by Glidden or Porter.
- S. Grout, non-shrink:
 1. Compressive strength: 8,475 PSI at 7 days.
 2. Non-shrinking.
 - a. Minwax Super Por-Rok or equivalent product by Savereisen or the specific metal product manufacturer.

2.2 FABRICATION

- A. Form to shapes indicated with straight lines, sharp angles, smooth curves.
- B. Drill or punch holes with smooth edges for temporary field connections and attachment of work by other trades.
- C. Make permanent shop and field connections with continuous fillet type welds.
- D. Grind exposed welds smooth.
- E. Conceal fastenings where practicable.
- F. Shop fabricate in as large assemblies as practicable.
- G. Meet requirements specified under Structural Steel for fabricating items of structural nature or use.
- H. Qualify welding processes and welding operators in accord with AWS.

2.3 SHOP PRIMING

- A. Galvanize items set in, or on, exterior surfaces.
- B. Apply shop primer to ferrous metal not indicated to be set in or receive concrete.
 1. Apply 2 shop coats to metals that will be inaccessible after erection.
 2. Do not prime stainless steel or aluminum.
- C. Remove scale, rust and deleterious materials before priming.
 1. Clean off rust and loose mill scale:
 - a. Steel, protected: SSPC SP-2, SP-3.
 - b. Steel, exposed to weather: SSPC SP-6.
 2. Remove contaminants in accordance with SSPC SP-1.
- D. Immediately after surface preparation, prime in accord with manufacturer's instructions.
 1. Provide uniform dry film thickness of 2.5 mil.
- E. Provide dissimilar metal protection coating:
 1. When dissimilar metals come in contact.
 2. When metal or aluminum is anchored to or in contact with concrete or masonry.
- F. Retouch scraped, abraded, weld burns, and unprimed areas.
 1. Use primer specified for shop coats.
 2. Priming does not count as a coat for finish painting.

2.4 METAL FABRICATIONS - PARTIAL LIST

- A. Supply items required to complete construction and installation.
- B. Anchorage accessories: Required to secure wood to metal, wood to masonry, metals to masonry or concrete, metal to metal or metal to other items.
- C. Ladders:

1. Galvanized steel.
 2. Side rail dimension of minimum 1/2 x 2 IN.
 3. Rungs: Minimum 7/8 IN round or square bars.
 4. Punch rungs through side rails and weld.
 5. Size to support concentrated moving load of 200 LB.
 6. Minimum clearance from centerline of rung to wall or obstruction: 7 IN.
 7. Minimum ladder width: 16 IN between side rails.
 8. Rung spacing: 12 IN O.C.
- D. Stairs, steel pan:
1. Fabricated as indicated.
 2. Stringers: Channel shape, min. 12 IN deep.
 3. Treads: Minimum 14 GA steel pans with self furring metal lath welded in pan.
 4. Risers: Minimum 14 GA.
 5. Landings: Minimum 10 GA pans with angle supports as required, with self furring lath welded in pan.
 6. Supports: Support stairs at locations indicated. Outside stringers shall span flight length plus landing. Intermediate supports are not allowed without prior approval.
 - a. Hangers: Minimum 1/2 diameter.
 - 1) Connect hangers to beams only. Hanger-slab connections are not permitted.
Maximum eccentricity from beam center line to hanger centerline shall be 2 IN.
 - b. Support brackets and posts: Attach to structure as required, use welded connections whenever possible. When required, expansion anchors in concrete shall only be used for shear type connections.
 7. Fabricate and design stair and landing assembly to support a 1000 LB concentrated, moving load or 100 PSF, whichever requires stronger component.
 8. Fabricate and design stair components in accordance with NAAMM Metal Stairs Manual.
 9. Design, fabricate, and install in compliance with applicable codes.
 10. Form surface with slip resistant materials: See Section 03312.
 11. Contractor's option: Provide factory manufactured stair system in lieu of fabricated stairs, subject to review by the Government.
- E. Handrails and guardrails:
1. Steel pipe or tube.
 - a. 1.66 x 0.14 IN HHS (Hollow Structural Section), ASTM-A53.
 - b. 1.5 x 0.83 IN round tube, ASTM-A500.
 2. Use galvanized steel for exterior use.
 3. Form to profiles indicated.
 4. Mount to provide total projection from walls not exceeding 3-1/2 IN.
 5. Set mounting brackets and posts maximum 8 FT O.C.
 6. Installed handrail or top of guardrail must be capable of withstanding minimum concentrated load of 250 LB applied in any direction at any point.
 7. Installed handrail or top of guardrail must be capable of withstanding minimum uniform load of 50 PSF applied horizontally and 100 PSF vertically, but not simultaneously with the concentrated load.
 8. Infill area of guardrail must be capable of withstanding minimum concentrated load of 200 LB applied horizontally at any point in the system, including intermediate rails or other materials serving the purpose, but not simultaneously with other design loads.
 9. Return ends of wall mounted rails to wall.
 10. Make rails smooth with no projections preventing a hand from sliding along entire length.
- F. Support angles, members and loose lintels:
1. ASTM-A36/A36M steel.
 2. Size as indicated.
 3. Galvanize units in or on exterior walls.
 4. Prime interior units.
- G. Bollards:

1. 6 IN diameter extra strength galvanized steel pipe.
 2. Size to provide minimum 42 IN projection above ground, more if so indicated, and minimum 36 IN embedment into concrete.
 3. Fabricate with welded on anchors.
 4. Fill with 3000 PSI concrete with rounded top.
- H. Supports:
1. ASTM-A36/A36M steel.
 2. Folding partition supports.
 3. Other miscellaneous support items.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify suitability of substrate to accept installation.
- B. Installation constitutes acceptance of responsibility for performance.

3.2 INSTALLATION

- A. Set work level, true to line, plumb.
- B. Shim and grout as necessary.
- C. Weld field connections and grind smooth.
- D. Where practical, conceal fastenings.
- E. Secure metal to wood with lag screws of adequate size with appropriate washers.
- F. Secure metal to concrete with embedded anchors, setting compounds, caulking and sleeves, or setting grout.
 1. Use expansion bolts, toggle bolts, or screws for light duty service.
- G. Meet structural requirements for erecting items of structural nature.
- H. Do not field splice fabricated items unless size requires splicing.
- I. Weld splices.
- J. Furnish handrails complete with brackets.
 1. Wherever pickets or posts are indicated to be set in sleeves, provide galvanized steel sleeves having a minimum wall thickness of 1/8 IN.
 2. Set pickets or posts in sleeves with non-shrink grout.
 3. Where setting is required for exterior, hold non-shrink grout back 1/4 IN from surface.
 4. Fill flush with sealant.
- K. Provide fabricated items complete with attachment devices as required to install.
- L. After galvanized units have been erected and anchored apply galvanizing repair paint in accordance with manufacturer's recommendations.
 1. Surface preparation: Remove contaminates in accord with SSPC SP-1.

END OF SECTION